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Viscous resuspension in pressure driven confined flows of suspensions ANAS MACHADO, HUGUES BODIGUEL, ANNIE COLIN, Univ of Bordeaux — Flows of non-Brownian semi-dilute suspensions are mainly governed by the spatial repartition of the particles. At low Reynolds numbers, it is indeed generally non-uniform due to the cross-stream migration towards low sheared regions of the flow. Though this phenomenon has been has been the focus of many work for several decades, discrepancies still exists between experiments and modelling, and in particular for pressure driven confined flows which are the focus of this work. In order to quantify shear induced migration, we take advantage horizontal flow of buoyant particles in slits, where viscous resuspension is balanced by buoyancy. We study PMMA rigid spheres of 6 μm dispersed several liquids of various density, and impose pressure driven flows in slits of several tens of μm. Using advanced particle imaging velocimetry techniques and confocal microscopy, we measure systematically both volume fraction and velocity profiles. At low flow rates, the particle density is highly asymmetric due to buoyancy whereas it becomes symmetric at high flow rate, due to shear-induced migration. The transition occurs for a given Shields number which we characterize as a function of concentration and confinement. The results are analyzed and discussed in the framework.

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